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On the presence of *Trachinus pellegrini* (Trachinidae) in the Canary and Cape Verde Islands (north-eastern Atlantic)

by

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Résumé. - Présence de *Trachinus pellegrini* (Trachinidae) aux îles Canaries et aux îles du Cap-Vert (Atlantique nord-est).

Trachinus pellegrini Cadenat, 1937 est signalée pour la première fois aux îles Canaries, ce qui représente sa limite de répartition la plus septentrionale. Les différences morphologiques entre adultes et juvéniles sont également présentées. La présence de cette espèce aux îles du Cap-Vert est aussi confirmée.

Key words. – Trachinidae - *Trachinus pellegrini* - Canary Islands - Cape Verde Islands - Eastern Atlantic - New record.

Trachinids (Perciformes) are small to medium-sized fishes (45 cm total length maximum) living, as often burrowers, on sandy or muddy bottoms in littoral areas and on the upper part of continental shelf of the eastern Atlantic Ocean (including the Mediterranean and Black seas), rarely down to 150 or 200 m of depth. Their gill cover spine and spines on first dorsal fin bear venomous glands. Weeverfishes are usually caught in bottom trawls and also in various artisanal fishing gears. They are not of great commercial importance, but they are esteemed as foodfishes in many localities (Roux, 1981; Bauchot, 1987; Nelson, 2006).

Up to date, the family Trachinidae was represented in the Canary Islands (Fig. 1) by two genera and three species: *Echiichthys vipera* (Cuvier, 1829), *Trachinus draco* Linnaeus, 1758, and *Trachinus radiatus* Cuvier, 1829 (Brito *et al.*, 2002; Brito and Sancho, 2003) and in the Cape Verde Islands (Fig. 1) by a single genus with three species: *Trachinus armatus* Bleeker, 1861, *Trachinus collignoni* Roux, 1957, and *Trachinus pellegrini* Cadenat, 1937 (Wirtz *et al.*, 2013).

Trachinus araneus Cuvier, 1829 was recorded from the Canaries by Steindachner (1867) and Brito (1991), but Brito *et al.* (2002) did not find any evidence of its presence, postulating a probable misidentification with *T. radiatus*. The authors have also found no evidence of this species.

Reiner (1996, 2005) recorded *T. araneus* from the Cape Verde, but Wirtz *et al.* (2013) pointed out that it is not a valid record, because no proof of existence

is given. *T. collignoni* was also recorded from the Cape Verde by Cadenat and Roux (1964) and subsequently compiled by Reiner (1996, 2005), but according to Wirtz *et al.* (2013), this record needs confirmation, on the basis of the uncertainty expressed by Cadenat and Roux (1964).

Following a series of surveys off the Canary Islands, *T. pellegrini* (Fig. 2A) was caught for the first time from this archipelago. An in-depth morphological comparison has resulted in the identification of *Trachinus* sp. from the Cape Verde Islands (see González *et al.*, 2014) as *T. pellegrini* (Fig. 2B). The present morphometric and meristic study will contribute to enrich the morphology data of this poorly known species.

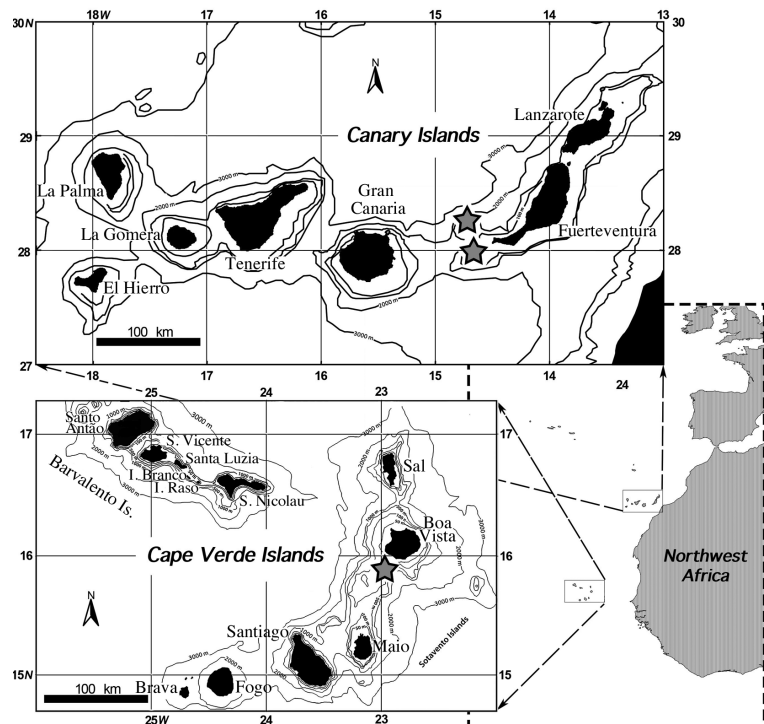


Figure 1. - The Canary and Cape Verde Islands. Collection locations for *Trachinus pellegrini* (★).

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Figure 2. - *Trachinus pellegrini*. **A:** Juvenile from the Canary Islands (TFMC-VP/1947, 68.0 mm TL, 59.6 mm SL); **B:** Subadult from the Cape Verde Islands (MMF42285, 119 mm TL, 101 mm SL). Scale bars = 25 mm.

MATERIAL AND METHODS

All specimens studied herein were caught during experimental fishing cruises on board Spanish research vessels around the Canary and the Cape Verde Islands. Cruises Infueco-0710 and Infueco-0611 took place around the Canaries on board the R/Vs *Emma Bardán* and *Miguel Oliver*, respectively. Cruise Camarão-2 was done around the Cape Verde on board the R/V *Prof. Ignacio Lozano*.

Canarian specimens examined were caught with dredge and small-scale bottom trawl off submarine banks nearby Fuerteventura Island (Fig. 1). The Cape Verdean specimen was collected in a bottom fish trap off Boa Vista Island (Fig. 1).

The present paper follows the best practice approach to overcome unverified and unverifiable “first records” as proposed by Bello *et al.* (2014).

Voucher specimens were deposited in the collections of the ‘Museo de Ciencias Naturales de Tenerife’ (TFMC) and the ‘Museu de História Natural do Funchal’ (MMF). Muscle tissue samples taken from specimens were stored at ICCM (‘Iniciativa de Colecciones de Ciencias Marinas’) from the Biology Department of the University of Las Palmas de Gran Canaria.

Meristic and morphometric measurements (in mm) were made following Hubbs and Lagler (1958). Other counts and terminology follow Cadenat (1937, 1938) and Roux (1981). Due to the high number of morphometric (23, including total length TL) and meristic (13) variables considered, as well as many body proportions (6), we have opted to explain abbreviations in table I.

RESULTS

Trachinus pellegrini Cadenat, 1937 (Figs 2A, B)

Material examined. - Canary Islands: MMF44358, one subadult, 93.6 mm TL, 79.7 mm SL, 28°16.7'N 14°46'W, Banco de Amanay, South-west of Fuerteventura Island, 114 m of depth, cruise Infueco-0710, sta. BV2, soft substrate, 6 Jul. 2010, small-

scale bottom trawl; TFMC-VP/1946, one subadult, 113.1 mm TL, 95.0 mm SL, 28°03'N 14°39'W, El Banquete, South of Fuerteventura Island, 188 m of depth, cruise Infueco-0710, sta. DR6, rocky bottom with sand, 10 Jul. 2010, dredge; TFMC-VP/1947 (Fig. 2A), one juvenile, 68.0 mm TL, 59.6 mm SL, 28°15'N 14°48.5'W, Banco de Amanay, South-west of Fuerteventura Island, 141 m of depth, cruise Infueco-0611, sta. BV4, soft substrate, 11 Jun. 2011, small-scale bottom trawl. Cape Verde Islands: MMF42285 (Fig. 2B), one subadult, 119 mm TL, 101 mm SL, 15°55'N 22°56'W, Ponta Lacacão, Boa Vista Island, 122-137 m of depth, cruise Camarão-2, sta. 15, rocky bottom with sand, 7 Mar. 2012, bottom fish trap.

Selected body proportions and meristics of the specimens studied are shown in table I and compared with the scarce morphology data available from the literature (Cadenat, 1937, 1938).

Regarding body proportions, data from the specimens examined herein agree in all respects with published data (Tab. I). Our specimens extend, above or below, the proportions IOD in %EDh, TL/Bdepth, TL/HL, EDh/SnL, PsOL/SnL and HL/EDh. In our specimens, pectoral fin length (PL) seems to show a tendency to decrease with size. The opposite seems to occur with least depth of caudal peduncle (CPHt) and also with caudal peduncle length (CPL) (taken at ventral profile). Also, inter-orbital distance (IOD) seems to increase with size (Tab. I).

When comparing with the holotype, meristics of the specimens examined herein agree in almost all respects, except for some minor differences (Tab. I), e.g. in second dorsal fin rays (one ray less), anal fin rays (one more ray), pectoral fin rays (14-16 vs 17) and caudal fin rays (two more rays). Our adult and subadult specimens bear six spines in the first-dorsal fin, except for the juvenile individual, which has only five spines. Lower gill rakers on the 1st arch coincide with the holotype. There is no published information on upper gill rakers to compare with our data. Lateral line scales ranged from 74 to 82 in our specimens, thus establishing a range that was not previously known. Antero-supraorbital spines in our material ranged from two to three, with one juvenile specimen bearing two on the right side and three on the left. Adult and subadult

Table I. - Selected counts, morphometrics and body proportions of *Trachinus pellegrini*.

	MMF42285 1 specimen 119 mm TL Cape Verde Islands Present study			TFMC/VP1946 1 specimen 113 mm TL Canary Islands Present study			MMF44358 1 specimen 94 mm TL Canary Islands Present study			TFMC/VP1947 1 specimen 68 mm TL Canary Islands Present study			Cadenat (1937, 1938) 2 spec., 137-140 mm TL Cape Verde Islands holotype, 215 mm TL Guinea-Conakry		
	mm	in %SL	in %HL	mm	in %SL	in %HL	mm	in %SL	in %HL	mm	in %SL	in %HL	mm	in %SL	in %HL
Morphometrics and body proportions															
Standard length, SL	101.0	–	–	95.0	–	–	80.0	–	–	60.0	–	–	–	–	–
Pre-first dorsal length, PD1L	26.0	25.7	–	21.0	22.5	–	19.0	23.5	–	16.0	26.1	–	no data	–	–
Pre-second dorsal length, PD2L	39.0	38.6	–	35.0	36.8	–	28.0	35.1	–	21.0	35.8	–	no data	–	–
Preal length, PAL	41.0	40.6	–	35.0	37.2	–	28.0	34.8	–	25.0	42.7	–	no data	–	–
Pre-anus length, PAnL	39.0	38.6	–	33.0	34.4	–	27.0	33.7	–	25.0	41.6	–	no data	–	–
Prepectoral length, PPL	32.0	31.7	–	26.0	26.9	–	21.0	26.4	–	18.0	30.2	–	no data	–	–
Pectoral fin length, PL	18.0	17.8	–	18.0	19.3	–	16.0	20.3	–	15.0	25.9	–	no data	–	–
Head length, HL	31.0	30.7	–	27.0	28.7	–	23.0	28.9	–	20.0	32.7	–	no data	–	–
Head height at posterior border of orbit, HHt	19.0	18.8	–	15.0	16.1	–	12.0	15.4	–	11.0	19.0	–	no data	–	–
Preopercular length, POPL	20.0	19.8	–	21.0	22.1	–	17.0	20.8	–	14.0	23.3	–	no data	–	–
Maximum body depth, Bdepth (at anus level)	25.0	24.8	–	21.0	21.7	–	18.0	22.4	–	15.0	24.5	–	no data	–	–
Least depth of caudal peduncle, CPHt	8.0	7.9	–	7.0	7.4	–	6.0	7.1	–	4.0	6.7	–	no data	–	–
Caudal peduncle length, CPL (at ventral profile)	7.0	6.9	–	4.0	4.2	–	2.5	3.1	–	2.0	3.1	–	no data	–	–
Snout length, SnL (until mid level of eye)	5.0	–	16.1	3.5	–	12.8	3.3	–	14.3	2.6	–	13.1	–	no data	no data
Eye diameter, EDh (horizontal)	8.5	–	27.4	6.5	–	23.7	6.2	–	26.8	5.7	–	29.4	–	26.7-28.6	–
Eye diameter, EDv (vertical)	7.0	–	22.6	5.0	–	18.4	5.3	–	23.0	5.0	–	25.6	–	no data	no data
Inter-orbital distance, IOD	2.5	–	8.1	2.0	–	7.3	1.3	–	5.5	1.0	–	5.0	–	no data	no data
Post-orbital length, PsOL	19.0	–	61.3	18.0	–	66.0	14.0	–	60.9	12.0	–	60.4	–	no data	no data
Upper jaw length, UpJL	14.0	–	45.2	13.0	–	48.3	11.0	–	46.0	9.0	–	47.2	–	no data	no data
Gape length, GL	11.0	–	35.5	11.0	–	40.6	9.0	–	38.2	7.0	–	37.8	–	no data	no data
Length of longest dorsal-fin ray (4th)	8.0	7.9	25.8	broken	13.1+	45.7+	14.8	18.6	64.5	6.8	11.4	34.9	no data	no data	no data
Length of longest anal-fin ray	8.0	7.9	25.8	6.7	7.0	24.5	5.3	6.6	22.9	5.5	9.2	28.2	no data	no data	no data
IOD in %EDh	29.4	–	–	30.9	–	–	–	20.6	–	17.1	–	–	25.0	–	–
TL/Bdepth	4.76	–	–	5.48	–	–	–	5.25	–	4.64	–	–	4.75-5.00	–	–
TL/HL	3.84	–	–	4.15	–	–	–	4.07	–	3.49	–	–	3.75-4.05	–	–
EDh/SnL	0.59	–	–	0.54	–	–	–	0.53	–	0.45	–	–	0.50	–	–
PsOL/SnL	3.80	–	–	5.14	–	–	–	4.24	–	4.60	–	–	4.90	–	–
HL/EDh	3.65	–	–	4.21	–	–	–	3.73	–	3.40	–	–	3.50-3.75	–	–

Table I; - Continued.

	MMF42285	TFMC/VP1946	MMF44358	TFMC/VP1947	Cadenat (1937, 1938)
Meristics					from holotype
First dorsal-fin spines	6	6	6	5	6
Second dorsal-fin rays	26	27	27	27	27-28
Anal fin rays	28	29	30	28	29-30
Pectoral fin rays	15	16	16	14	17
Caudal fin rays (segmented)	15	14	14	15	13
Branchiostegal rays	6	6	6	6	6
Upper gill rakers (1st arch)	7	1 tubercle + 5	1 tubercle + 5	6	no data
Lower gill rakers (1st arch)	12 + 1 tubercle	12 + 2 tubercles	12 + 2 tubercles	12	12 + 2 tubercles
Total developed gill rakers	19	17	17	18	no data
Scales in lateral line	74	79	79	76	82
Antero-superior orbital spines (right/left)	2	3	3	2 / 3	2
Preopercular spines	absent	absent	absent	4 small spines on inferior edge	absent

specimens examined have no preopercular spines. The juvenile has four small spines on the lower edge of preopercle (Tab. I).

Anal-fin rays are fleshy and their segmentation is hardly visible in adult or subadult specimens (ranging 94-119 mm TL), while they are not fleshy and segmentation is well visible in the juvenile specimen examined (68 mm TL).

Like in Roux (1981), our four specimens have the first dorsal-fin bluish grey. On the comparative table in Cadenat (1938), the author says the first dorsal fin is entirely transparent. However, in the text describing the species, Cadenat (1937, 1938) clarified that first dorsal-fin of type material is light bluish grey, bordered excessively pale yellow and with no trace of black spots, as found in other species.

Regarding the extraordinary development of the second-dorsal rays, Cadenat (1938) says that it is a minor character, manifesting perhaps at the time of reproduction, or is only a secondary sexual character in males.

The maximum published length for the species is 200 mm TL, common length 150 mm TL (Roux, 1990). Our material ranges from 68 to 119 mm TL, most probably corresponding to juvenile to subadult individuals.

Remarks. - *T. pellegrini* is an eastern Atlantic species, ranging from Mauritania (Froese and Pauly, 2015, FishBase) and Senegal to Nigeria, including the Cape Verde Islands (Roux, 1990). Previous records from the Canary Islands by Roux (1981, 1990) could not be confirmed. Its presence around the Cape Verde Islands was confirmed by Menezes *et al.* (2004).

This is a tropical demersal species, inhabiting rock and sand bottoms (Roux, 1981), to a maximum depth of 188 m [previously 150 m (Roux, 1981; Schneider, 1990)]. The specimens examined herein were collected on rocky bottom with sand and on soft substrata, at depths between 122 and 137 m (Cape Verdes) and from 114 to 188 m (Canaries). The upper limit of its vertical distribution remains unknown. According to Roux (1981) it feeds mainly on crustaceans.

Trachinus pellegrini is recorded for the first time from the Canary Islands waters fixing now the northernmost limit (28°16.7'N) of the species distribution. Although the species was known with certainty from the Senegalese coasts (Roux, 1990), Roux (1981) had already pointed out "possibly ranging further north" and it has been recently found in Mauritania (Froese and Pauly, 2015, FishBase). Moreover, *T. pellegrini* is, up to date, the only *Trachinus* species inhabiting both the Canary and Cape Verde Islands.

In the last thirty years, sea surface temperature in the area of the Canary Islands has shown an increasing trend (Santos *et al.*, 2012), with records over 24°C. In this scenario, the appearance of *T. pellegrini* in the Canary Islands waters would not be surprising, and its presence could be one more evidence of the changes in the distribution of species due to warming in the Atlantic. This phenomenon ('tropicalization') has been observed in the Canaries even for species with low dispersal ability (Falcón *et al.*, 2002; Brito *et al.*, 2005).

Another hypothesis explaining the present record of *T. pellegrini* in the Canaries could be its misidentification with *T. radiatus*, since both species have radiating bony crests on top of head behind eyes. Possibly the species is also present in the Atlantic Moroccan and Saharan neighboring coasts and has passed unnoticed. If this is the case, we are in the presence of a eurythermal species, occurring both in tropical waters (Cape Verdes) and in temperate waters (Fuerteventura banks, Canaries).

Finally, it would be worth mentioning the possibility of transport in ballast waters, discarded close to or in the surroundings of main harbours (see Brito *et al.*, 2011). Over the last five years, tran-

sits of oil platforms between Africa and major ports of the Canaries for repair and maintenance have greatly increased. Although remote, this hypothesis should not be ruled out as these enormous floating structures come mostly from the coast of central Africa, e.g. off Nigeria, within the known distribution of *T. pellegrini*.

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REFERENCES

- BAUCHOT M.L., 1987. - Poissons osseux. Trachinidae. In: Fiches FAO d'identification des espèces pour les besoins de la pêche. (Rév. 1). Méditerranée et mer Noire. Zone de pêche 37. Vol. 2. Vertébrés (Fischer W., Bauchot M.L. & M. Schneider, eds), pp. 1393-1398. Rome: FAO.
- BELLO G., CAUSSE R., LIPEJ L. & DULČIĆ J., 2014. - A proposed best practice approach to overcome unverified and unverifiable "first records" in ichthyology. *Cybium*, 38(1): 9-14.
- BRITO A., 1991. - Catálogo de los Peces de las Islas Canarias: 419 p. La Laguna, Tenerife: Lemus.
- BRITO A. & SANCHO A., 2003. - Phylum Chordata, Clase Osteichthyes. In: Lista de Especies marinas de Canarias (Algas, Hongos, Plantas y Animales) (Moro L., Martín J.L., Garrido M.J. & Izquierdo I., eds), pp. 118-131. La Laguna: Gobierno de Canarias / Gesplan.
- BRITO A., PASCUAL P.J., FALCÓN J.M., SANCHO A. & GONZÁLEZ G., 2002. - Peces de las Islas Canarias. Catálogo comentado e ilustrado. 419 p. La Laguna: Lemus.
- BRITO A., FALCÓN J.M. & HERRERA R., 2005. - Sobre la tropicalización reciente de la ictiofauna litoral de las Islas Canarias y su relación con cambios ambientales y actividades antrópicas. *Viera y Clavay*, 33: 515-525.
- BRITO A., CLEMENTE S. & HERRERA R., 2011. - On the occurrence of the African hind, *Cephalopholis taeniops*, in the Canary Islands (eastern subtropical Atlantic): introduction of large-sized demersal littoral fishes in ballast water of oil platforms? *Biol. Invasions*, 13(10): 2185-2189.
- CADENAT J., 1937. - Recherches systématiques sur les poissons littoraux de la côte occidentale d'Afrique. Liste des poissons littoraux récoltés par le navire "Président Théodore-Tissier" au cours de sa cinquième croisière (1936). *Rev. Trav. Inst. Pêches Marit.*, 10(fasc. 4, no. 40): 425-562.
- CADENAT J., 1938. - Sur un poisson trachinoidé nouveau de la côte occidentale d'Afrique. *Bull. Mus. Natl. Hist. Nat.* (sér. 2), 10(3): 262-268.
- CADENAT J. & ROUX C., 1964. - Résultats scientifiques des campagnes de la Calypso: Iles du Cap-Vert. III. Poissons téléostéens. *Ann. Inst. Océanogr. Monaco*, 41: 81-102.
- FALCÓN J.M., BRITO A., PASCUAL P., GONZÁLEZ-LORENZO G., SANCHO A., CABRERA M., BÁEZ A., MARTÍN-SOSA P. & BARQUÍN J., 2002. - Catálogo de los peces de la Reserva Marina de La Graciosa e Islotes al norte de Lanzarote. Tropicalización reciente del poblamiento íctico. *Rev. Acad. Canar. Cienc.*, 14(3-4): 119-138.
- FROESE R. & PAULY D. (eds), 2015. - FishBase. World Wide Web electronic publication. www.fishbase.org, version (Feb. 2015).
- GONZÁLEZ J.A., MARTINS A., SANTANA J.I., TRIAY-PORTELLAR., MONTEIRO C., GARCÍA-MARTÍN V., JIMÉNEZ S., GONZÁLEZ-LORENZO G., PAJUELO J.G., LORENZO J.M. & BISCOITO M., 2014. - New and rare records of fishes (Pisces: Osteichthyes) from the Cape Verde Islands (eastern-central Atlantic Ocean). *Cybium*, 38(4): 289-300.
- HUBBS C.L. & LAGLER K.F., 1958. - Fishes of the Great Lakes region. *Cranbrook Inst. Sci. Bull.*, 26: 1-213.
- MENEZES G.M., TARICHE O., PINHO M.R., DUARTE P.N., FERNANDES A. & ABOIM M.A., 2004. - Annotated list of fishes caught by the R/V ARQUIPÉLAGO off the Cape Verde archipelago. *Arquipélago – Life Mar. Sci.*, 21A: 57-71.
- NELSON J.S., 2006. - Fishes of the World. 4th edit., 601 p. Hoboken, New Jersey, USA: John Wiley & Sons, Inc.
- REINER F., 1996. - Catálogo dos peixes do Arquipélago de Cabo Verde. *Publ. Avulsas IPIMAR*, 2: 1-339.
- REINER F., 2005. - Peixes do Arquipélago de Cabo Verde: 340 p. Instituto Nacional de Desenvolvimento das Pescas, República de Cabo Verde. Mindelo.
- ROUX C., 1981. - Trachinidae. In: FAO species identification sheets for Fishery Purposes. Eastern Central Atlantic; fishing areas 34, 47 (in part) (Fischer W., Bianchi G. & Scott W.B., eds), 4: 1-20. Ottawa: FAO.
- ROUX C., 1990. - Trachinidae. In: Check-List of the Fishes of the Eastern Tropical Atlantic (CLOFETA) (Quéro J.C., Hureau J.C., Karrer C., Post A. & Saldanha L., eds), 2: 893-895. Lisbon: JNICT; Paris: SEI; and Paris: UNESCO.
- SANTOS F., de CASTRO M., GÓMEZ-GESTEIRA M. & ÁLVAREZ I., 2012. - Differences in coastal and oceanic SST warming rates along the Canary upwelling ecosystem from 1982 to 2010. *Cont. Shelf Res.*, 47: 1-6.
- SCHNEIDER W., 1990. - FAO Species Identification Sheets for Fishery Purposes. Field Guide to the Commercial Marine Resources of the Gulf of Guinea: 268 p. Prepared and published with the support of the FAO Regional Office for Africa. Rome: FAO.
- WIRTZ P., BRITO A., FALCÓN J.M., FREITAS R., FRICKE R., MONTEIRO V., REINER F. & TARICHE O., 2013. - The coastal fishes of the Cape Verde Islands – new records and an annotated check-list. *Spixiana*, 36(1): 113-142.